

REMARKS

Reconsideration in view of the foregoing amendments and following remarks is respectfully requested.

By this amendment, editorial corrections have been made to the specification. No new matter has been added.

In the Office action mailed May 19, 2003, claim 1 was rejected under 35 U.S.C. 102(b) as being anticipated by Sano et al. (US 6,097,084).

By this amendment claim 1 is canceled and new claims 2-6 are presented. The new claims have been carefully formulated to patentably distinguish over the Sano et al. reference, as is explained in detail below. First, however, a review of the purpose, object, chief structural aspects, and salient features of the present invention is provided so that when the differences between the device of Sano et al. are pointed out, full appreciation thereof will be realized.

The present invention concerns a light emitting diode (LED) which is to be incorporated into a scoreboard, a message center, a graphic display, or any other construction which employs a multitude of LEDs that project from a printed circuit board and thence through an opening in a faceplate and terminate at a level for viewing. Prior art LEDs were too short to extend the distance from the printed circuit board to the needed level above the faceplate for acceptable viewing. To remedy this drawback, an interceding spacer was placed between the upper surface of the printed circuit board and the lower surface or base of the LED to raise the top of the LED to the desired level for viewing. However, this procedure created other drawbacks: namely, (1) added time and labor to install the spacer, (2) instability of the LED when mounted on the spacer, (3) difficulty in effecting a proper environmental seal between the spacer and the printed circuit board and between the LED and

the spacer, and (4) because of the presence of a spacer, the inability to install the LED with auto-insertion apparatus.

Therefore, the general purpose and object of the present invention is to provide a light emitting diode with an extended length and with a base or lower surface of such structure that it can be flush mounted onto the upper surface of a printed circuit board with auto-insertion apparatus and without an interceding spacer, and when so mounted, will extend, by virtue of the extended length, the needed distance from the printed circuit board for it to project through a faceplate of a scoreboard, a message center, a graphic display, or other construction the requisite distance to provide for acceptable viewing. The extended length can be achieved by means of an extended length body region formed integrally in one unitary mass with the molded main body of the light emitting diode, or it can be achieved by means of a separate molded body extension fitted to and permanently affixed to the molded main body of the light emitting diode. In either situation, the base or lower surface of the extended length light emitting diode is planar in its entirety so that it will bear directly against and lie flush with the upper surface of the printed circuit board so that proper environmental sealing of the light emitting diode to the printed circuit board can be attained.

In addition to an extended length and an entirely planar base or lower surface, another significant feature of the extended length light emitting diode is the upper domed portion of the molded body which permits favored dispersal of the light to viewers.

With the purpose, object, chief structural aspects, and salient features of the present invention as presented in the foregoing review brought to attention, the Sano et al. reference is now discussed.

In the Office action dated May 19, 2003, the Examiner pointed in particular to FIG. 5(b) and column 1, lines 15-25 of Sano et al. The device there shown and discussed is a photointerrupter device 10 which comprises a package 3 of molded resin in the form of two upstanding pillars each of rectangular cross section which are joined together at their lower portions by an integral bridging segment. One of the pillars houses a light emitting element 1, and the other pillar houses a light receiving element 2. The elements 1 and 2 face each other across an intervening gap 3b. The package 3 has a planar base from which leads 11 and 12 from the light emitting element 1 and leads 21 and 22 from the light receiving element 2 project. The package 3 is mounted onto a printed circuit board 4.

The photointerrupter device 10 shown in Sano et al. is used for determining the presence or absence of an object within the gap 3b. It has nothing whatever to do with a scoreboard, a message center, a graphic display, or any other construction involving an LED which is provided for viewing, and, in fact, could not even be used in such capacity. The light emitting element 1 shown in Sano et al. faces the light receiving element 2 and is visible to an observer, if indeed it could even be seen by an observer, only if the observer were in a position such that his eye, at most, was but inches away from it. In contrast, the extended length LED, as claimed, has a molded body with an upper domed portion through which light emitted from the LED die emanates for viewing. This is recited in part b. of each of claims 2, 3 and 4. As such, the claimed extended length LED can be viewed by an observer from any position around its periphery and from afar. This is an important distinction over Sano et al.

Further, the extended length light emitting diode, as claimed, has a cylindrical shape as opposed to the completely different shape involving two rectangular cross section pillars

connected by a bridging segment shown in Sano et al. The cylindrical shape of the claimed extended length light emitting diode enables it to extend through a circular opening in a faceplate and to be closely positioned to other extended length light emitting diodes arrayed therewith. The device 10 shown in Sano et al. has no such capability.

Still further, there is no conception in Sano et al. of extended length. Consequently, there is nothing in Sano et al. which corresponds in concept or structure to the features expressed in part c. of claims 2 and 3; and there is nothing in Sano et al. which in any way corresponds to the separate molded body extension defined in parts c. and d. of claim 4. Nor does Sano et al. disclose anything responding to the limitations of claims 5 and 6.

Accordingly, the newly presented claims 2-6 clearly patentably define over Sano et al. and should be allowed. Reconsideration and allowance of claims 2-6 is respectfully requested.

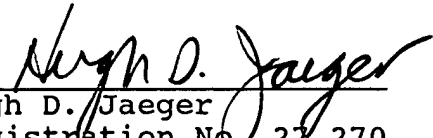
If there are any further issues yet to be resolved to advance this patent application to issue, the Examiner is requested to telephone the undersigned counsel so that such issues may be resolved expeditiously.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,

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By


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EXTENDED LENGTH LIGHT EMITTING DIODE

PARTS LIST

10	extended LED body region	32	faceplate
10a	LED body extension	34 36	hole hole
12	body		
12a	body		
14	extended length light emitting diode		
14a	light emitting diode		
16	reference plane		
16a	lower planar base		
18	electrical connection lead		
19	upper planar surface		
20	electrical connection lead		
22	planar base		
22a	<u>lower planar base surface</u>		
24	printed circuit board		
26	coating material		
28	LED die		
30	hole		